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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/987,932	11/16/2001	Chalmer G. Kirkbride	3495-7000US3	7958
7590 05/11/2004			EXAMINER	
MORGAN & FINNEGAN, L.L.P.			LEUNG, JENNIFER A	
345 Park Avenue			ART UNIT	
New York, NY 10154			PAPER NUMBER	

1764

DATE MAILED: 05/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/987,932

Applicant(s)

KIRKBRIDE ET AL.

Examiner

Jennifer A. Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 23-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 23-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_

## **DETAILED ACTION**

### ***Response to Preliminary Amendment***

1. The preliminary amendment submitted on November 16, 2001 has been received and carefully considered. Claims 1-22 are cancelled. Claims 23-33 remain active.

### ***Specification***

2. Starting on page 1, line 9, the phrase, -- now U.S. Patent No. 6,319,395, -- should be inserted after the phrase, "This application is a division of a continuation-in-part application Serial No 09/522,475 filed on March 9, 2000," in order to update applicant's related applications. (see Preliminary Amendment).

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 29 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, because "said hot gas cleanup" and "the hot gas cleanup" lack proper positive antecedent basis.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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4. Claims 23, 24 and 27-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Hoekstra (US 3,565,751).

Regarding claim 23, Hoekstra (Figure) discloses a reactor system comprising:  
a fluidized bed reactor (reactor vessel **10**) including an oil shale or tar sand feed inlet (via shale delivery line **24**); and  
a feed introducing system connected to the feed inlet **24** comprising:  
a sizing and screening device (grinder or crusher **12**; column 3, lines 9-19); and  
a feeder device for introducing the reduced feed into the reactor **10** (via transfer line **14** and pair of storage hoppers **14**; or via conventional mechanical means such as auger conveyors and the like; column 3, lines 18-53; column 4, line 63 to column 5, line 8).

Regarding claim 24, Hoekstra (Figure; column 3, lines 54-61; column 4, lines 50-62) discloses the fluidized bed reactor **10** comprises a gas inlet for introducing a hydrogen mixture into the reactor (via hydrogen input line **32**); and a product stream outlet for discharging a product stream from the reactor (via gas outlet line **34**); wherein the reactor system further comprises a hydrogen recycling system connected between the product stream outlet **34** and the gas inlet **32** (including hydrogen recycle line **62**).

Regarding claim 27, Hoekstra (Figure; column 3, lines 50-61) discloses the feed inlet **24** is adjacent a bottom end of the reactor **10** and introduces the feed approximately horizontally into the reactor (see Figure); the gas inlet **32** is adjacent a bottom end of the reactor **10**; and the product stream outlet **34** is adjacent a top end of the reactor **10**.

Regarding claim 28, Hoekstra (Figure; column 3, line 54 to column 4, line 5; column 4,

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lines 33-40, 50-67) discloses the hydrogen recycling system comprises:

a separating and purifying device (cyclone separators **40**, filter **51**) for removing a substantially solids free hydrogen rich stream from the product stream in line **34** to form a recycle hydrogen stream;

a mixing point/conduit at the intersection of hydrogen recycle line **62** and hydrogen input **32**, inherently defining a mixing device, for combining the fresh hydrogen stream from a hydrogen make up source **30** with the recycle hydrogen stream in line **62** and admixing the two streams immediately downstream of the intersection to form a hydrogen mixture;

a heater (hydrogen heater **38**) for heating the fresh and recycle hydrogen streams; and

a compressor (compressor **36**, **66**, **68**) for pressuring the fresh and recycle hydrogen.

Regarding claim 29, Hoekstra (Figure; column 3, lines 43-53) discloses a heat exchanger (dense phase solids heat exchanger **26**, dilute phase solids heat exchanger **28**) in communication with a hot gas cleanup (cyclones **40**, filter **51**) for transferring heat from a product stream (in line **34**, **42**) to a portion of a hydrogen mixture stream exiting the compressor (in line **24**).

Regarding claim 30, Hoekstra (Figure; column 4, lines 40-50) discloses the separating and purifying device comprises a gas-liquid separator (fractionator **52**) for separating a product stream exiting the heat exchanger **26**, **28** into a synthetic crude oil product stream and a gas stream (via lines **60**, **54**, **56** and/or **58**).

Instant claims 23, 24 and 27-30 structurally read on the apparatus of Hoekstra.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoekstra (US 3,565,751) in view of Matheson (US 2,614,069).

Hoekstra (Figure; column 4, lines 7-40) discloses the system comprises at least one separator (cyclone separators **40**) in fluid communication with the reactor **10** via the product stream outlet **34**, for removing entrained solids from the product stream, and a spent solids outlet (via spent shale line **42**, spent shale hopper **44**, spent shale removal line **48**) for discharging spent shale from the system. Hoekstra further discloses a hot gas cleanup (filter **51**) communicating with the separators **40** for removing fines entrained in the product stream. However, Hoekstra is silent as to the specifically recited separator and spent solids outlet configuration; namely, the separators **40** being at least partially located within the reactor **10**, and the spent solids outlet **42**, **44**, **48** being located adjacent a top end of the reactor **10**.

Matheson (Figure; column 5, line 15 to column 6, line 50) teaches a fluidized bed reactor **30** suitable for the hydrogenation of carbonaceous materials, including oil shale and tar sands (column 4, lines 12-35), wherein the reactor **30** comprises a separator **18** at least partially located within the reactor **30** for the removal of entrained solid particulates from gas outlet line **22**.

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Matheson further teaches,

“A substantial portion of the coal fines entrained in the volatile carbonization products are separated in separator **18** and returned through line **20** to the bottom portion of reactor **30** to aid in the maintenance of a proper particle size distribution in accordance with the invention. Separator **18** may also be arranged down-stream of some conventional cooling means outside reactor **30**, if the high temperatures of reactor **30** make this appear more advisable.” (column 6, lines 33-43).

Thus, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to modify the apparatus of Hoekstra such that the externally located separator **40** was at least partially located within reactor **10** (i.e., suitable in cases where the temperature within the reactor is not critical to the functioning of the separator), because both internally and externally located separators would function equivalently in the separation of entrained solids from the gas outlet, and furthermore, the shifting of separator location depending on intended use would involve routine skill in the art, as evidenced by Matheson above.

The spent solids outlet of Hoekstra (i.e., spent shale line **42**) will inherently be located within the fluidized bed reactor **10** (i.e., in the form of a dipleg) given that the externally located separator **40** has been modified to be at least partially located within the reactor **10**, according to the teachings of Matheson. Therefore, it would have been obvious for one of ordinary skill in the art to provide a spent solids outlet to reactor **10**, in order to enable the disclosed discharge of spent shale from the system as originally accomplished via line **42**. Furthermore, given that the spent shale comprises “finely divided particles” that inherently tend to concentrate at the top of the reactor **10** in comparison to the heavier fresh oil shale or tar sand that inherently tends to concentrate at the bottom of the reactor **10** (column 3, lines 12-16; column 4, lines 7-32), it would have been obvious for one of ordinary skill in the art at the time the invention was made

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to position the spent solids outlet adjacent the top end of the reactor **10** in the system of Hoekstra, since the spent shale will inherently be at its highest concentration in this region.

6. Claims 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoekstra (US 3,565,751) in view of Rosen et al. (US 3,960,700).

Regarding claim 31, Hoekstra is silent as to providing a scrubbing system, located downstream of the gas-liquid separator **52**, to remove impurities from the gas stream for producing a substantially pure hydrogen recycle stream. Rosen et al. (Figure; column 4, lines 21-32) teaches a system for the hydrogenation of a carbonaceous material including oil shale or tar sand (column 2, lines 14-25) in a suitable reactor (column 4, lines 43-49), wherein the system comprises a scrubber system (labeled, SCRUBBER) having an inlet connected to a gas-liquid separator (labeled, LIQUID PRODUCT RECOVERY), wherein the gas stream flows from the gas-liquid separator into the inlet of the scrubbing system, to remove impurities from the gas stream and produce a substantially pure hydrogen recycle stream (labeled, RECYCLE GAS). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a scrubbing system downstream of the gas-liquid separator **52** in the system of Hoekstra, because the addition of a scrubber system would enable further purification of the hydrogen recycle stream, thereby minimizing reintroduction of deleterious components to the reactor, removing noncondensing products or components, and maintaining a desirable hydrogen-to-carbonaceous material weight ratio within the reactor through controlled metering, as taught by Rosen et al. (column 2, lines 25-48).

Regarding claims 32 and 33, Hoekstra is silent as to the mixing device (recycle line **62**, input **32**) and the compressor **36**, **66**, **68** being of unitary construction (i.e., in Hoekstra, the



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hydrogen gas streams are instead compressed separately, prior to being combined and mixed within line 32). In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the apparatus of Hockstra such that the mixing device and compressor were of a unitary construction, on the basis of suitability for the intended use, because the integration of parts or process steps involves routine skill in the art. Rosen et al. (Figure; column 2, lines 38-48; column 3, lines 11-25) evidences such conventionality by teaching that the system inherently comprises a mixing device and compressor being of unitary construction (labeled, HYDROGEN COMPRESSION AND METERING), wherein the hydrogen recycle stream (labeled, RECYCLE GAS) and fresh hydrogen stream (labeled, MAKE UP H<sub>2</sub>) are combined prior to being simultaneously mixed and compressed to form a pressurized hydrogen mixture within the HYDROGEN COMPRESSION AND METERING apparatus, for feeding to the reactor at a desired hydrogen-to-carbonaceous material weight ratio. Similar to Hoekstra, Rosen et al. also teaches the pressurized hydrogen mixture flows from the mixing device/compressor and then through a heat exchanger or heater (labeled, HYDROGEN PRE-HEATER), prior to being fed to the reactor.

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Matheson (US 2,561,396) illustrates the inherent distribution of lighter particulates to the upper regions of a fluidized bed and heavier particulates to the lower regions of the fluidized bed, wherein outlets (i.e., conduits 8, 9) located in each region, respectively, are provided to remove a given particulate size from the fluidized bed (relevant to claims 25 and 26 above).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449.

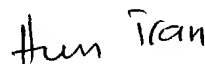
The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer A. Leung

May 5, 2004 

  
**HIEN TRAN**  
**PRIMARY EXAMINER**